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IDENTIFICATION OF LARYNGEAL NERVES IN SURGICAL WOUND

Background. Nowadays the latest research was made by the world and domestic medical centers have proved that the endocrine diseases are steadily increasing. Here it is necessary to emphasize that surgery on the thyroid gland is characterized by specific complications, including the injury of laryngeal nerves that, in their turn, can cause the violation of phonatory function and hypoparathyroid. [1, 2] Subjective and objective methods of identification are used to alleviate the search of laryngeal nerves. These methods are based on visualization of nerve tissue in the wound and monitoring to ensure the integrity and nerve conduction after the surgery, or a phase of surgery.

It is well-known, that widely used methods for monitoring of laryngeal nerves being related only to the recurrent nerves are not entirely accurate and do not allow to identify the nerve tissue among the tissues of the wound. Some of them, including the method of electromyography, laryngoscopy and method by Devis are made up technically, requiring special equipment and additional medical specialists.[3]

Objective: To develop a highly effective simple method for intraoperative identification and monitoring of laryngeal nerves.

Materials and methods.

The study involved 115 patients who were operated on the thyroid glands, they were divided into two groups: the first group – 65 patients to whom our proposed method was used and the second one – 50 patients, they were observed with the help of the method called visual inspection.

To identify laryngeal nerves in a surgical wound it is used some means for processing the information signal a signal is being processed with a certain software module, which includes filtering, it determines the maximum amplitude and frequency of the filtered signal for each intraoperative observation recording the data to process the information signal.

Proposed method of identification and monitoring of laryngeal nerves is based on the stimulation of the surgical wound tissues with the fixed frequency AC, for which muscular and other tissues of the wound have low conductivity, while the larynx nerves have high conductivity of the electrical signal. Laryngeal nerve stimulation leads to the contraction of larynx muscles in the form of short-term tetanus, which is the impetus for reducing tension of the larynx and vocal cords. Altogether these reactive processes cause the change of a glottis and, as a result, the sound effects that occur when the air passes through it. Phonation is recorded with the sound sensor installed in the tube of the laryngeal mask and further it turns into electrici-

ty. Then, with the help of a power converter the data is being accompanied by the sound, playback appears on a computer screen. In the patients of the first group there were identified 194 laryngeal nerves, from which 97 recurrent and 97 superior laryngeal nerve. In the patients of the second group – 76 recurrent nerves, from which 52- during the thyroidectomy 24 – during the hemithyroidektomy.

It is established that the amplitude and frequency of the informative signal output depends on the distance from the active electrode to the recurrent nerves when the stimulation laryngeal nerves reaches its top point. Having a positive result of stimulation there is a tension of vocal cords, which forms the sound waves. Being fixed by the sensor located in the laryngeal mask a corresponding digital signal is transmitted for processing and evaluation on a computer with special software. So, it is possible to determine the presence or absence of stimulation – the signal is displayed on the computer.

The same settings of stimulation and phonography were used in all cases. While intraoperative nerves being stimulated the ranges of signal was divided according to the distance of stimulation electrode: the signal was obtained without or with stimulation of wound tissues at the distance of > 7 mm with the range from 0.05 to 1.0 units (m ± m = 0.23 ± 0.01 u) with the height and frequency in the range from 1 to 20 kHz (m ± m = 10.71 ± 0.2 kHz). Stimulation dipstick approaches the recurrent nerve at the distance of 4-6 mm and the height of signal is unchanged, the value of frequency increases in proportion to the range from 3 to 21 kHz (m ± m = 13.3 = 0.02 kHz). With further approximation of the active electrode to the lower laryngeal nerve at the distance of 2-3 mm the height of signal increases from 0.1 up to 11 units (m ± m + 0.36 ± 0.057 u) and frequency – from 7 to 22kHz (m ± m = 14.44 ± 0.16 kHz). While the recurrent nerve being stimulated the signal indicators were the highest in all cases and had the range of height from 0.2 to 1.3 units (m ± m = 0.54 ± 0.0014 u) and frequency from 8 to 25 kHz (m ± m = 16.5 ± 0.24 kHz). The intensity of signal decreases with the distance from stimulating electrode to the nerve, giving a possibility to verify an intraoperative nerve among the tissues of the wound.

With further removal from the nerve the level of signal went down according to the distance stimulating electrode to the nerve and returned to the initial level, the exception there were tracheal tissues and laryngeal cartilages, as they have much more higher electrical resistance.

Result of researches. The results of the research are very successful. We identified and monitored 91 recurrent nerves in 65 patients operated on thyroid disease and there were no cases of transient or permanent paresis of vocal cords. These results are confirmed by otolaryngologist.

Our results are unique, according to the data of analyzed literature any of existing methods, deal with identification and monitoring of laryngeal nerves, doesn't have such high performance.

Conclusion. The identification of laryngeal nerves among the tissues of wound by using the alternating electric current with the desired physiological

parameters doesn't lead to the reflection or depletion of the neuron-muscle system. The amplitude and frequency of the received signals and their changes directly depend on the distance from the stimulating electrode to the nerve. It allows to find the laryngeal nerves in the tissues of the wound without any mistakes.

Developed method allows to identify laryngeal nerves while operating on the thyroid gland extremely accurate without having complications such as injuries of laryngeal nerves.

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ON THE PATHOLOGICAL FEATURES OF THE COURSE OF ACUTE CEREBROVASCULAR

Pathologicoanatomic studies have always shown a basic facts about structural changes in acute cerebrovascular diseases and related by autopsies of patients described changes found, a comparison of in vivo observations. In the future held systematization of the data. With autopsy determined the cause of death of patients peculiarities of acute cerebrovascular events in each case, developing accurate statistics of death and mortality, it appears effectiveness of certain new drugs and more. During the pathologicoanatomic we get an idea of the more exciting medical initial morphological manifestations of acute cerebrovascular events, time of occurrence, as we are able to look at the opening of the changes in other organs and systems that seem to be not affected by the pathological process in vivo and are not always be recognized.

Thus, the provision of specialized angio neurological care for stroke should be conducted in angio neurological offices, patients should be delivered there as soon as possible, preferably within the therapeutic window. To optimize the provision of care to patients with acute cerebrovascular events in Ukraine must create a sufficient network of specialized stroke offices equipped devices Computer tomography or MRT, working around the clock. They should organize regular service in the department of computer tomography Military Medical Clinical Centre of Southern region to ensure that the Computer tomography of the brain in all patients with acute cerebrovascular who received inpatient treatment at the Military Medical Clinical Centre South region for two hours. They should organize round the clock duty multidisciplinary team with mandatory participation neurologist, neurosurgeon, cardiologist, rehabilitologist. Permission to transport a patient with acute cerebrovascular shall provide qualified angio neurologist who will then deal with the treatment of the patient, not the physician, organizer or representative of the administration.